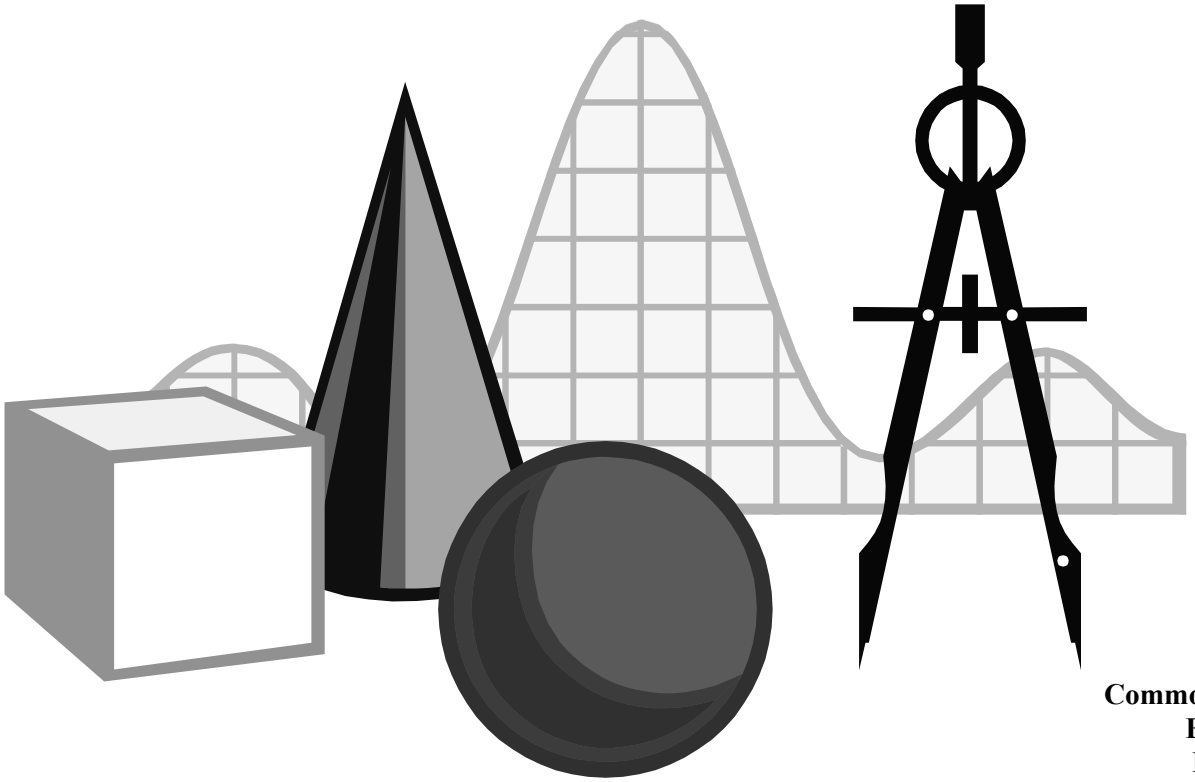
MATHEMATICS STANDARDS OF LEARNING SAMPLE SCOPE AND SEQUENCE

Grade 6



Commonwealth of Virginia
Board of Education
Richmond, Virginia
2002

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

by the

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The *Mathematics Standards of Learning Sample Scope and Sequence* and the *Mathematics Standards of Learning Curriculum Framework* can be found in a PDF and Word file format on the Virginia Department of Education's Web site at http://www.pen.k12.va.us.

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Preface

As an additional resource to help school divisions develop curricula aligned to the 2001 Mathematics Standards of Learning, the Virginia Department of Education has developed sample scope and sequence documents in kindergarten through grade eight and in core high school courses. These sample documents provide guidance on how the essential knowledge and skills that are identified in the Standards of Learning and the Standards of Learning Curriculum Framework may be introduced to students in a logical, sequential, and meaningful manner.

These sample scope and sequence documents are intended to serve as general guides to help teachers and curriculum developers align their curricula and instruction to support the Standards of Learning. Each sample document is organized around specific topics to help teachers present information in an organized, articulated manner. Also included are correlations to the Standards of Learning for that curricular area for a particular grade level or course, as well as ideas for classroom assessments and teaching resources.

The sample scope and sequence documents are not intended to prescribe how curriculum should be developed or how instruction should be delivered. Instead, they provide examples showing how teachers and school divisions might present to students in a logical and effective manner information that has been aligned with the Standards of Learning. School divisions that need assistance in developing curricula aligned with the Standards of Learning are encouraged to consider the sample scope and sequence guides. Teachers who use the documents should correlate the content identified in the guides with available instructional resources and develop lesson plans to support instruction.

Copies of the sample scope and sequence guides are available at http://www.pen.k12.va.us in both PDF and Microsoft Word formats. These materials are copyrighted, and all rights are reserved. Reproduction of these materials for instructional purposes in Virginia classrooms is permitted.

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Introduction

This middle school sample scope and sequence is based on the essential knowledge and skills listed under each Mathematics Standard of Learning in the Curriculum Framework. It is not intended to be a complete list of all the lessons that need to be taught and mastered during the middle school years, but instead organizes the key skills and processes around organizational topics reflective of the focus of the Standards of Learning. An important aspect of these organizational topics is the use of representations and relationships. Students can develop and deepen their understanding of mathematical concepts and relationships as they create, compare, and use various representations to organize and record their thinking about mathematical ideas.

Students in the middle grades use problem solving, mathematical communication, mathematical reasoning, connections, and representations to integrate understanding across the content in the Mathematics Standards of Learning. In the middle grades students build on the concrete reasoning experiences developed in elementary school while developing the deeper mathematical understandings required for success in abstract learning experiences. Students who have successfully completed the middle grades mathematics program should be prepared for high school mathematics course work.

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizing Topic	SOL Grade 6	SOL Grade 7	SOL Grade 8
Rational Numbers: Representations & Relationships	6.1 6.2 6.4 6.5	7.1 7.14	8.5
Rational Numbers: Operations/Estimation	6.6 6.7 6.8	7.2 7.4 7.5 7.6	8.1 8.3 8.7 8.10
Rational Numbers: Order of Operations		7.2	8.1 8.4
Number Sense/ Number Theory	6.3 6.22	7.1 7.2 7.3 7.5	8.1 8.2 8.5
Proportional Reasoning	6.2	7.6 7.11	8.3 8.17
Measurement: Actual/Estimate	6.9 6.10 6.11 6.12 6.13 6.14	7.7 7.8	8.6 8.7 8.10
Geometry: Basic Ideas	6.11 6.13 6.14 6.15 6.16	7.9 7.10	8.6 8.10

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizing Topic	SOL Grade 6	SOL Grade 7	SOL Grade 8
Geometry: Plane	6.14 6.15	7.7 7.9 7.10	8.8 8.10
Geometry: Solid	6.17	7.8	8.7 8.9
Geometry: Spatial Relationships	6.17	7.10 7.12 7.13	8.8 8.9 8.16
Data Analysis: Representations & Relationships	6.2 6.8 6.18 6.19	7.16 7.17 7.18	8.12 8.13
Probability	6.2 6.20	7.14 7.15 7.18	8.11
Patterns and Functions: Representations & Relationships	6.21 6.22	7.18 7.19	8.14 8.16 8.17
Algebra: Representations & Relationships	6.23	7.2 7.3 7.20 7.21 7.22	8.4 8.14 8.15 8.16 8.17 8.18

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Rational Numbers: Representations & Relationships *Fractions*	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**		▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives: Colored counters, blocks, fraction strips, fraction circles, fraction towers, Fraction Islands, Geoboards ▪ Grid Paper ▪ Computer software ▪ Mathematics SOL *Curriculum Framework*
	▪ Describe a relationship within a set by comparing part of the set to the entire set. ▪ Describe a relationship between two sets by comparing part of one set to a corresponding part of the other set. ▪ Describe a relationship between two sets by comparing all of one set to all of the other set. ▪ Describe a relationship within a set by comparing one part of the set to another part of the same set. ▪ Represent the relationship that makes a comparison by using the notations $\frac{a}{b}$, a:b, and a to b.	6.2		
	▪ Represent in fraction form a given shaded region of a 10-by-10 grid. ▪ Describe orally and in writing the equivalent relationship among fractions that have denominators that are factors of 100.	6.1		
	▪ Compare two whole numbers by representing the numbers with concrete objects or picture representations or by using the symbols <, >, or =. ▪ Compare two fractions with denominators of 12 or less by representing the fractions with fraction manipulatives or picture representations or by using the symbols <, >, or =.	6.4		

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Number Sense/ Number Theory *Fractions*	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**		▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives, Geoboards, Fraction Islands, fraction strips, fraction circles, tangrams, fraction towers, colored counters ▪ Grid Paper ▪ Computer software ▪ Mathematics SOL *Curriculum Framework*
	▪ Identify common multiples and the least common multiple for up to three numbers less than or equal to 50. ▪ Identify common factors and the greatest common factor for up to three numbers less than or equal to 50. ▪ Identify which numbers are prime for numbers less than or equal to 50. ▪ Identify which numbers are composite for numbers less than or equal to 50. ▪ Explain orally and in writing why a number is prime or composite.	6.3		

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Rational Numbers: Operations/ Estimation *Fractions*	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**		▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives: Fraction strips, fraction circles; Fraction Islands, Fraction Towers; Geoboards, Egg Cartons, etc. ▪ Grid Paper ▪ Mathematics SOL *Curriculum Framework*
	▪ Convert fractions to equivalent forms to perform the operations of addition and subtraction. ▪ Simplify fractional answers to simplest form. ▪ Solve problems that involve addition and/or subtraction with fractions and mixed numbers, with and without regrouping, that include like and unlike denominators of 12 or less, and express answers in simplest form. ▪ Solve problems that involve multiplication and/or division with fractions and mixed numbers that include denominators of 12 or less, and express answers in simplest form.	6.6		
	▪ Solve multistep practical problems involving whole number and fractions by using estimation strategies and checking for the reasonableness of results.	6.7		
	▪ Solve multi-step consumer application problems involving fractions with denominators not greater than 12, where solutions require at least a 2-step process.	6.8		

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Rational Numbers: Representations & Relationships *Decimals*	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** ▪ Compare two decimals through thousandths by representing the decimals with decimal manipulatives or picture representations or by using place-value charts or the symbols <, >, or =.	6.4	▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives: Base ten blocks, Geoboards, Fraction Islands ▪ Grid Paper ▪ Computer software ▪ Mathematics SOL *Curriculum Framework*

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Rational Numbers: Operations & Estimation *Decimals*	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**		▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives: Base ten blocks, Geoboards, Fraction Islands ▪ Grid Paper ▪ Computer software ▪ Mathematics SOL *Curriculum Framework* ▪ DOE *Fractions, Decimals, Proportions and Percents* Staff Development Guide
	▪ Given a dividend expressed as a decimal through thousandths and a divisor expressed as a decimal to thousandths with exactly one non-zero digit, find the quotient. ▪ Given a dividend expressed as a decimal through thousandths and a divisor expressed as a decimal to thousandths with more than one non-zero digit, find the quotient by using a calculator.	6.6		
	▪ Solve multistep practical problems involving whole numbers, decimals, and fractions by using estimation strategies and checking for the reasonableness of results.	6.7		
	▪ Solve multi-step consumer application problems involving fractions with denominators not greater than 12 and decimals not greater than 100s, where solutions require at least a 2-step process.	6.8		

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Rational Numbers: Representations & Relationships *Integers*	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**		▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives: Base ten blocks, Geoboards, Fraction Islands ▪ Grid Paper ▪ Computer software ▪ Mathematics SOL *Curriculum Framework*
	▪ Identify an integer represented by a point on a number line. ▪ Represent an integer on a number line. ▪ Compare and order integers, using a number line. ▪ Compare integers, using the mathematical symbols <, >, and =.	6.5		

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Number Sense/Number Theory	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**		▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives: Thermometers, Algeblocks, Two-color counters, Number Lines ▪ Grid Paper ▪ Computer Software ▪ Mathematics SOL *Curriculum Framework*
	▪ Explain orally and in writing why a given integer is even (divisible by two) or odd (not divisible by two).	6.3		
	▪ Recognize and describe patterns with exponents by using a calculator. ▪ Recognize and describe patterns of perfect squares. ▪ Recognize and describe patterns with square roots and squares by using squares, grid paper, and calculators. ▪ Recognize powers of ten by examining patterns in a place-value chart: $10^4 = 10{,}000$, $10^3 = 1000$, $10^2 = 100$, $10^1 = 10$. ▪ Write scientific notation for a number greater than 10.	6.22		

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Proportional Reasoning *Setting up ratios is important for studying Proportions in later grades.*	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**		▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives: Items to compare as sets ▪ Grid Paper ▪ Computer Software ▪ Mathematics SOL *Curriculum Framework*
	▪ Describe a relationship within a set by comparing part of the set to the entire set. ▪ Describe a relationship between two sets by comparing part of one set to a corresponding part of the other set. ▪ Describe a relationship between two sets by comparing all of one set to all of the other set. ▪ Describe a relationship within a set by comparing one part of the set to another part of the same set. ▪ Represent the relationship that makes a comparison by using the notations $\frac{a}{b}$, a:b, and a to b.	6.2		

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Measurement: Actual/Estimate	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**		▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives: Rulers, scales, measuring cups ▪ Grid Paper ▪ Calculators ▪ Computer Software ▪ Mathematics SOL *Curriculum Framework*
	▪ Compare and convert units of measure for length, area, weight/mass, and volume within the U.S. Customary system and the metric system. ▪ Estimate the conversion of units of length, area, weight/mass, and volume between the U.S. Customary system and the metric system by using ballpark comparisons. ▪ Determine the most appropriate unit of measure for a given situation.	6.9		
	▪ Estimate measurements by comparing the object to be measured against a benchmark. ▪ Solve measurement problems by estimating and determining length, using standard and nonstandard units of measure. ▪ Solve measurement problems by estimating and determining weight/mass, using standard and nonstandard units of measure. ▪ Solve measurement problems by estimating and determining area, using standard and nonstandard units of measure. ▪ Solve measurement problems by estimating and determining liquid volume/capacity, using standard and nonstandard units of measure.	6.10		

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Geometry: Basic Ideas	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**		▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives: Rulers, scales, measuring cups ▪ Grid Paper ▪ Calculators ▪ Computer Software ▪ Mathematics SOL Curriculum Framework
	▪ Determine if a problem situation involving polygons of four or fewer sides represents the application of perimeter or area.	6.11		
Measurement: Actual/Estimate	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**			
	▪ Apply formulas to solve problems involving area and perimeter of triangles and rectangles.	6.11		
	▪ Derive an approximation for pi (3.14 or $\frac{22}{7}$) by gathering data and comparing the circumference to the diameter of various circles, using concrete materials or computer models. ▪ Find the circumference of a circle by substituting a value for the diameter or the radius into the formula $C = \pi d$ or $C = 2\pi r$. ▪ Find the area of a circle by using the formula $A = \pi r^2$. ▪ Determine the circumference and/or area of a circle, using various tools. ▪ Create and solve problems that involve finding the circumference and/or area of a circle when given the diameter or radius.	6.12		

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Geometry: Basic Ideas	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**		▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives: Angle rulers, protractors, attribute blocks, tangrams, triangles, quadrilaterals, polygons ▪ Grid Paper ▪ Mathematics SOL *Curriculum Framework* ▪ DOE *Geometry for Middle School Teachers* Staff Development Guide
	▪ Estimate visually the angle measure of a given angle by using 45°, 90°, and 180° as referents, and use appropriate tools to check the reasonableness of the estimate.	6.13		
Measurement: Actual/Estimate	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**			
	▪ Draw and measure acute, right, and obtuse angles, using appropriate tools.	6.13		
	▪ Identify the sum of the measures of the angles of any triangle. ▪ Determine that the sum of the measures of the angles of a triangle is 180°.	6.14		
Geometry: Basic Ideas	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**			
	▪ Classify a triangle by its angles. ▪ Classify a triangle based on the size of its angles and/or its sides. ▪ Classify and describe the similarities and differences in sets of triangles by sorting.	6.14		

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Geometry: Basic Ideas (cont'd.).	▪ Characterize polygons as congruent and noncongruent according to the measures of their sides and angles. ▪ Determine the congruence of segments, angles, and polygons by direct comparison, given their attributes.	6.15	▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives: Angle rulers, protractors, attribute blocks, tangrams, triangles, quadrilaterals, polygons ▪ Grid Paper ▪ Mathematics SOL *Curriculum Framework* ▪ DOE *Geometry for Middle School Teachers* Staff Development Guide
	▪ Construct the perpendicular bisector of a line segment by using a variety of tools. ▪ Construct the bisector of an angle by using a variety of tools.	6.16		

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Geometry: Plane	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**		▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives: angle rulers, attribute blocks, triangles, quadrilaterals, polygons, rulers ▪ Grid Paper ▪ Computer software ▪ Mathematics SOL *Curriculum Framework* ▪ DOE *Geometry for Middle School Teachers* Staff Development Guide
	▪ Classify triangles, quadrilaterals, pentagons, and hexagons. ▪ Classify a triangle based on the size of its angles and/or its sides. ▪ Identify the sum of the measures of the angles of any triangle or quadrilateral. ▪ Classify and describe the similarities and differences in sets of triangles by sorting. ▪ Classify quadrilaterals by pairs of parallel sides by sorting. ▪ Identify and describe the similarities and differences in sets of quadrilaterals by sorting.	6.14		
	▪ Characterize polygons as congruent and noncongruent according to the measures of their sides and angles. ▪ Determine the congruence of segments, angles, and polygons by direct comparison, given their attributes.	6.15		

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Geometry: Solid	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**		▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives: Solids, Attribute blocks, rulers, angle rulers, polygons ▪ Grid Paper, Dot Paper ▪ Computer software ▪ Mathematics SOL *Curriculum Framework* ▪ DOE *Geometry for Middle School Teachers* Staff Development Guide
	▪ Construct models for rectangular prisms, cones, cylinders, and pyramids. ▪ Sketch rectangular prisms, cones, cylinders, and pyramids from three-dimensional models.	6.17		

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Geometry: **Spatial Relations**	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**		▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives: Solids, Attribute blocks, rulers, angle rulers, polygons ▪ Grid Paper, Dot Paper ▪ Computer software ▪ Mathematics SOL *Curriculum Framework* ▪ DOE *Geometry for Middle School Teachers* Staff Development Guide
	▪ Sketch rectangular prisms, cones, cylinders, and pyramids from two-dimensional representations and three-dimensional models. • Construct models for rectangular prisms, cones, cylinders, and pyramids. ▪ Identify a three-dimensional model of a prism, cone, cylinder, or pyramid from its two-dimensional representation. ▪ Classify rectangular prisms, cones, cylinders, and pyramids by their two-dimensional representations.	6.17		

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Data Analysis Representation	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**		▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives: sets to compare ▪ Grid Paper ▪ Newspaper ads ▪ Calculators ▪ Mathematics SOL *Curriculum Framework* ▪ DOE *Probability and Statistics* Staff Development Guide
	▪ Describe a relationship between two sets by comparing part of one set to a corresponding part of the other set. ▪ Describe a relationship between two sets by comparing all of one set to all of the other set.	6.2		
Data Analysis Relationships	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**			
	▪ Determine essential information necessary to solve consumer application problems. ▪ Choose the operation or operations required to solve the problem. ▪ Solve multistep consumer application problems involving fractions with denominators not greater than 12 and decimals not greater than hundredths, where solutions require at least a two-step process. ▪ Represent the solution as a data table or graph. ▪ Present and justify the solution orally or in writing. ▪ Plan and maintain a budget.	6.8		

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Data Analysis Relationships (cont'd.) *Include Whole Numbers, Fractions, Decimals, and Percents.*	▪ Collect data sets of no more than 20 items by using tally sheets, surveys, observations, questionnaires, interviews, and polls. ▪ Organize data by using lists, charts, and tables. ▪ Organize and display data in bar and line graphs, displaying the information as clearly as possible by using increments of whole numbers, fractions, and decimals rounded to the nearest tenth. ▪ Organize and display data in circle graphs by depicting information as fractional parts that are limited to halves, fourths, and eighths. ▪ Organize and display data sets of no more than 20 numbers in stem-and-leaf plots where the stem is listed in ascending order and the leaves are in ascending order, with or without commas between leaves. ▪ Organize and display data sets of no more than 20 numbers in box-and-whisker plots, identifying the lower extreme (minimum), lower quartile, median, upper quartile, and upper extreme (maximum). Use the critical points in a box-and-whisker plot to determine the range and the interquartile range. ▪ Decide which type of graph is appropriate for a given situation. – Bar graphs are used to display categorical (discrete) data. – Line graphs are used to display continuous data. – Circle graphs are used to show a relationship of the parts to a whole. ▪ Interpret data from line, bar, and circle graphs and from stem-and-leaf and box-and-whisker plots.	6.18	▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives: Items for data, ▪ Grid Paper ▪ Calculators ▪ Graphing Calculators ▪ Computer Software ▪ Spreadsheets with graphing software ▪ Mathematics SOL *Curriculum Framework* ▪ DOE *Probability and Statistics* Staff Development Guide

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Data Analysis Relationships (cont'd.) *Include Whole Numbers, Fractions, and Decimals..*	▪ Find the mean for a set of data. ▪ Find the median for a set of data. ▪ Find the mode for a set of data. ▪ Find the range for a set of data. ▪ Describe the three measures of central tendency and a situation in which each would best represent a set of data.	6.19	▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives: Items as data ▪ Grid Paper ▪ Calculators ▪ Mathematics SOL *Curriculum Framework* ▪ DOE *Probability and Statistics* Staff Development Guide

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Probability	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**		▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives: Colored counters, blocks, etc.; household items; spinners, dice, random number generators ▪ Grid Paper ▪ Graphing Calculator ▪ Mathematics SOL *Curriculum Framework* ▪ DOE *Probability and Statistics* Staff Development Guide
	▪ Describe a relationship within a set by comparing part of the set to the entire set. ▪ Describe a relationship between two sets by comparing part of one set to a corresponding part of the other set. ▪ Describe a relationship between two sets by comparing all of one set to all of the other set. ▪ Describe a relationship within a set by comparing one part of the set to another part of the same set. ▪ Represent the relationship that makes a comparison by using the notations $\frac{a}{b}$, a:b, and a to b.	6.2		
	▪ Plan and carry out experiments that use concrete materials to find a sample space. ▪ Determine the sample space for selected experiments and represent the sample space for up to 20 possibilities as a list, chart, picture, and/or tree diagram. ▪ Given a sample space, determine the probability of a simple event. Represent the probability as a ratio, fraction, decimal, or percent where the fraction's denominator does not exceed 20, decimals are rounded to tenths, and percent is rounded to $\frac{1}{10}$ of a percent	6.20		

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Patterns & Functions: Representation & Relationship	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**		▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Calculator ▪ Manipulatives ▪ Grid Paper ▪ Mathematics SOL *Curriculum Framework* ▪ DOE *Patterns, Functions, Algebra* Staff Development Guide
	▪ Investigate and apply strategies to recognize and describe the change between terms in numerical patterns. ▪ Investigate and apply strategies to recognize and describe geometric patterns. ▪ Describe verbally and in writing the relationships between consecutive terms in a numerical or geometric pattern. ▪ Extend and apply numerical and geometric patterns to similar situations. ▪ Create numerical and geometric patterns by using a given rule or mathematical relationship. ▪ Describe numerical and geometric patterns, including triangular numbers.	6.21		
	▪ Recognize and describe patterns with exponents by using a calculator. ▪ Recognize and describe patterns of perfect squares. ▪ Recognize and describe patterns with square roots and squares by using squares, grid paper, and calculators. ▪ Recognize powers of ten by examining patterns in a place-value chart: $10^4 = 10{,}000$, $10^3 = 1000$, $10^2 = 100$, $10^1 = 10$.	6.22		

Grade 6 Mathematics Standards of Learning Sample Scope and Sequence

Organizational Topic	Essential Knowledge and Skills	Related SOL	Sample Classroom Assessment Methods	Sample Resources
Algebra: Representation & Relationship *Include Whole Numbers, Fractions, and Decimals.*	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to**		▪ Student Demonstrations ▪ Individual Quizzes ▪ Group Quizzes ▪ Tests ▪ Projects ▪ Investigations ▪ Portfolios ▪ Questioning Strategies ▪ Peer evaluations	▪ Manipulatives: Algeblocks ▪ Grid Paper ▪ Calculators ▪ Computer Software ▪ Mathematics SOL *Curriculum Framework* ▪ DOE *Patterns, Functions, Algebra* Staff Development Guide
	▪ Represent a one-step equation, using a variety of concrete materials such as colored chips on an equation mat, algebra tiles, or weights on a balance scale. ▪ Solve a one-step equation by demonstrating the steps algebraically. ▪ Use the following algebraic terms appropriately: *equation*, v*ariable, term,* and *coefficient*. ▪ Identify examples of equations, variables, terms, and coefficients.	6.23		